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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEADER, WILLIAM T	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/849,345	PARK ET AL.	
	Examiner	Art Unit	
	William T. Leader	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) *15-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 14* is/are rejected.

7)☒ Claim(s) *12 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Receipt of the papers filed on May 6, 2004, are acknowledged. Applicant has elected Species I and identified claims 1-14 as reading on the elected species. Claims 15-18 are withdrawn from consideration.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 6, 7, 11 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Jorne et al (6,132,587).

4. The Jorne et al patent is directed to the uniform electroplating of wafers. Apparatus for carrying out the electroplating process is shown in figure 1. The apparatus includes contacts 9 which are indirect contact with the electroplating metal 10 on the surface of the wafer (column 5, lines 60-66). A power supply is represented by the + and - connections shown in figure 1. As shown in the figure, the - terminal of the power supply is connected through a lead wire to the contacts 9. A counter electrode 2 which

functions as an anode during electroplating is placed in contact with an electrolyte and connected through a lead wire to the + terminal of the power supply. Jorne discloses that it is known to provide electrical contacts attached to the periphery of the wafer (column 3, lines 1-3). These contacts correspond to the second contact recited in instant claim 7. Jorne recognizes that a non-uniform current distribution is produced (column 3, lines 4-6). To provide a uniform current distribution, Jorne teaches that contact points can be also distributed over the entire surface of the wafer, preferentially at the center (column 5, lines 2-6). The contact at the center corresponds to the contact at an approximate center recited in instant claim 6. Thus, Jorne discloses all elements recited in instant claim 6 and 7. By suggesting the use of a center contact in a process of electroplating a wafer, Jorne anticipates instant method claim 11. By discussing the provision of a uniform current density, Jorne suggests controlling the ratio of power supplied from the contact and second contact to be constant as recited in claim 14.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having

ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 8, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jorne et al (6,132,587) in view of Yoshioka et al (6,500,317).

Claims 8, 9 and 10 differ from the apparatus of Jorne by reciting a second power supply portion. While Jorne teaches the use of a plurality of contacts, the reference does not specifically disclose that some of the contacts are connected to a second power supply in addition to the first power supply. The Yoshioka et al patent is directed to a method and apparatus for electroplating onto a semiconductor wafer. A plurality of feeder contacts 15 are provided to supply power to the wafer. See figure 6 which shows eight contacts. Yoshioka et al discloses that plating current supply device includes eight plating current supply circuits 42-1 to 42-8. Terminals T1-T8 and To are connected to terminals T1-T8 and To shown in figure 11. Each plating supply circuit is provided with a current control circuit 39 which sets the circuit value based on a comment from the CPU (computer) for plating conditions. See column 7, lines 15-44. Thus, Yoshioka et al disclose second power supply portions as recited in claims 8, 9 and 10.

9. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have utilized a separate power supply in Jorne for each contact, particularly where each power supply is operated by a computer

as taught by Yoshioka et al because control of the plating process would have been improved. Claim 8 recites that the controller controls to increase and decrease alternatingly; claim 9 recites that the power supply and second power supply portion are to be implemented alternatingly; and claim 10 recites a ration of power supplies to be constant. These limitations relate to the manner in which the apparatus is used. The computer control of each of the individual power supplies of Yoshioka et al would have been capable of operation in this manner.

10. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jorne et al (6,132,587) in view of Yoshioka et al (6,500,317) as applied to claims 8, 9 and 10 above, and further in view of Kamitakahara et al (5,167,792).

Claim 1 is similar to claim 6 discussed above, but includes the limitation that the contact comes into electrical contact with a metal layer of a substrate being treated that has the metal layer formed thereon and a through hoe, through the through hole from an opposite surface. This limitation is written as a process limitation. It is interpreted as requiring apparatus capable of carrying out the process function recited. The Jorne patent describes making contact to the center of the wafer but does not disclose making contact through a through hole from an opposite surface. The Kamitakahara et al patent is directed to electroplating metal onto a

substrate. Power may be supplied either to the center or the periphery of the substrate. In the embodiment shown in figure 2, power is supplied to the center of the substrate by a contact which projects through a through hole in the substrate from the side opposite that to be plated. It would have been obvious at the time the invention was made to have provided power to the center of the substrate in the process and apparatus of Jorne by utilizing a contact which projects through a through hole in the substrate from the side opposite that to be plated as taught by Kamitakahara et al because power would have been effectively applied to the front surface of the substrate. Claims 2-5 are similar to claims 7-10 discussed above.

Allowable Subject Matter

11. Claims 12 and 13 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record does not suggest operation of the claimed process where power supplies are controlled to increase and decrease alternatingly or are implemented alternatingly as recited in claims 12 and 13.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Hofer et al (4,134,801) patent is

discloses electroplating using contacts placed both near the periphery of the workpiece and near the center.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 571-272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WL
William Leader
August 19, 2004

ROY KING
SUPERVISORY PATENT EXAMINER
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